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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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7590

07/03/2002

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| EXAMINER |
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TRAN, TAN N

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| ART UNIT | PAPER NUMBER |
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2826

DATE MAILED: 07/03/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/007,833

Applicant(s)

AVERY ET AL.

Examiner

TAN N TRAN

Art Unit

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 05 November 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-15 and 17-31 is/are rejected.
- 7) ☐ Claim(s) 16 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Oath/Declaration

1. The oath/declaration filed on 11/05/01 is acceptable.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 2, 4, 17, 24-31 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 2, line 2, "the lateral trigger device" lacks of antecedent basis.

In claims 4 and 17, lines 1, 2, "a non high-doped region" is unclear as to what does applicant mean by a non high-doped region?

In claim 24, lines 10, 11, "at least one N+ doped trigger tap disposed proximate and between the at least one P+ doped region in said N-well" is unclear as to what does applicant mean by at least one N+ doped trigger tap disposed proximate and between?

line 12, "the drain" lacks of antecedent basis:

line 13, "the source" lacks of antecedent basis.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3-5, 7-9, 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Polgreen et al. (5,465,189).

With regard to claim 1, Polgreen et al. discloses an electrostatic discharge protection circuit comprising a silicon controlled rectifier having an anode p+ coupled to the protected circuitry and a cathode n+ coupled to ground Vss, the cathode having at least one first high - doped region; at least one trigger-tap, disposed proximate to the at least one high-doped region and an external on-chip triggering device coupled to the trigger-tap and protected circuitry. (Note figs. 14, 16, 18 of Polgreen et al.)

With regard to claim 3, Polgreen et al. discloses the SCR comprises a first bipolar transistor and a second bipolar transistor; the first bipolar transistor having the at least one first high doped region ET1 serving as an emitter and forming the cathode, a first low doped region (BT1,CT2) coextensively forming a base of the first bipolar transistor and a collector of the second bipolar transistor, a second low doped region (CT1,BT2) coextensively forming a base of the second bipolar transistor and a collector of the first bipolar transistor, and a second high doped region ET2 serving as an emitter of the second bipolar transistor and forming the anode. (Note Fig. 14, 16, 18 of Polgreen et al.).

With regard to claim 5, Polgreen et al. discloses the bases of the first and second transistors have base widths less than 4.0 microns. (Note lines 27-32, column 1 of Polgreen et al.).

With regard to claims 4, 14, Polgreen et al. discloses a surface area over a non high-doped region and between the respective first and second high-doped regions of the first and second bipolar transistors are blocked from shallow isolation 6. (Note figs. 1 a, 14 of Polgreen et al.).

With regard to claim 7, Polgreen et al. discloses the at least one first high doped region is a n+ type material ET1, the first low doped region is a p-type material (BT1, CT2), the second low doped region is a n-type material (CT1, BT2), and the second high doped region is a p+ type material ET2. (Note Fig. 14, 16, 18 of Polgreen et al.).

With regard to claim 8 Polgreen et al. discloses the trigger device is a MOSFET transistor selected from the transistor group consisting of a NMOS. (Note Fig. 14, 16, 18 of Polgreen et al.).

With regard to claim 9, Polgreen et al. discloses the source and drain of the MOSFET transistor are respectively coupled to the trigger-tap p+ type and to the protected circuitry. (Note Fig. 14, 16, 18 of Polgreen et al.).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 6, 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Polgreen et al. (5,465,189).

With regard to claim 6, Polgreen et al. discloses all claimed invention, except the bases of the first and second transistors have base widths in a range of 0.6 to 0.8 microns. However, although Polgreen et al. does not teach exact the type of the transistors have base widths as that claimed by Applicant, the type differences are considered obvious design choices and are not patentable unless unobvious or expected results are obtained from these changes. It appears that these changes produce no functional differences and therefore would have been obvious. Note in re Leshin, 125 USPQ 416.

With regard to claim 10, Polgreen et al. discloses the gate of the MOSFET is coupled to the source of the MOSFET transistor selected from the transistor group consisting of the NMOS. (Note fig. 18 of Polgreen et al.).

With regard to claim 11, Polgreen et al. disclose all the claimed subject matter except for the triggering device is a MOSFET transistor selected from the transistor group consisting of a PMOS. However, it would have been obvious to one of ordinary skill in the art to form the triggering device of Polgreen et al. is a MOSFET transistor selected from the transistor group consisting of a PMOS, because NMOS can be replaced by PMOS. Note Fig. 14, 16, 18 of Polgreen et al. are cited to support for the well know position.

With regard to claim 12, Polgreen et al. discloses the drain and source of the MOSFET transistor are indirectly coupled to the trigger-tap and the protected circuitry. (Note figs. 13, 14 of Polgreen et al.).

With regard to claim 13, Polgreen et al. discloses the gate of the MOSFET is indirectly coupled to the source of the MOSFET transistor selected from the transistor group consisting of the NMOS. (Note fig. 18 of Polgreen et al.). It would have been obvious to one of ordinary skill in the art to replace the NMOS FET of Polgreen et al. by the PMOS FET because NMOS FET PMOS FET can be interchanged.

Claims 15, 17-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Polgreen et al. (5,465,189) in view of Applicant's prior art.

With regard to claim 15, Polgreen et al. discloses a SCR comprising a substrate; at least on N + doped region in the p-well and coupled to ground; a P+ doped region in the N-type substrate and coupled to a pad of the protected circuitry; at least one p+ doped trigger-tap disposed proximate to the at least one N+doped region in the P-well and a triggering device coupled to the SCR wherein one terminal is coupled to the pad and second terminal is indirectly coupled to the trigger tap. (Note Fig. 13, 14, 16, 18 of Polgreen et al.).

Polgreen et al. does not disclose a N-well and an adjacent P-well formed in the substrate and defining a junction therebetween;

However, Applicant's prior art discloses a N-well 106 and an adjacent P-well formed in the substrate 103 and defining a junction 107 therebetween: (Note figs. 1A, 1B of Applicant's prior art).

Therefore, it would have been obvious to one of ordinary skill in the art to form the Polgreen et al.'s device having a N-well and an adjacent P-well formed in the substrate and defining a junction therebetween such as taught by Applicant's prior art in order to turn off the trigger tap when the trigger device has high voltage.

With regard to claims 17, 23, Polgreen et al. discloses a surface area over a non high-doped region and between the P+ doped region and the at least one N+ doped region is fully shallow trench isolated 6. (Note figs. 1a, 14 of Polgreen et al.).

With regard to claim 18, Polgreen et al. discloses respective base widths between the p+ doped region and the junction, and between the at least one N+ doped region and the junction are less than 4.0 microns. (Note lines 27-32, column 1 of Polgreen et al.).

With regard to claim 19, Applicant's prior art discloses a P-well-tie is coupled to the P-well and grounded. (Note figs. 1A, 1B of Applicant's prior art).

With regard to claim 20, Polgreen et al. discloses the trigger device is a MOSFET transistor selected from the transistor group consisting of a NMOS. (Note Fig. 14, 16, 18 of Polgreen et al.).

With regard to claim 21, Polgreen et al. discloses the drain and source of the MOSFET transistor are indirectly coupled to the trigger-tap and the pad. (Note figs. 13, 14 of Polgreen et al.).

With regard to claim 22, Polgreen et al. discloses the gate of the MOSFET is coupled to the source of the MOSFET transistor selected from the transistor group consisting of the NMOS. (Note fig. 18 of Polgreen et al.).

Allowable Subject Matter

5. Claims 2, 24-31 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Claims 2, 24-31 are allowable over the prior art of record, because none of these references disclose or can be combined to yield the claimed invention such as a lateral shunt resistor coupled between the cathode and a lateral triggering device, a triggering device coupled to the SCR wherein the second terminal is coupled to ground via a shunt resistor in claim 2, and the source is coupled to the pad via a shunt resistor in claim 24.

6. Claim 16 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 16 is allowable over the prior art of record because none of these references disclose or can be combined to yield the claimed invention such as the second terminal is coupled to ground via a shunt resistor.

Conclusion

7. Any inquiry concerning this communication or earlier communication from the examiner should be directed to Tan Tran whose telephone number is (703) 305-3362. The examiner can normally be reached on M-F 8:30AM-5PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on (703) 308-6601. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for after final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

TT

June 2002

Minh Loan Tran
Minh Loan Tran
Primary Examiner